

Additional Analysis of Alternative Margin Protection Programs

Requested by Dairy Industry Advisory Committee

Chuck Nicholson, PhD and Mark Stephenson, PhD

Cal Poly and University of Wisconsin

January 2011

Programs Analyzed

This document discusses additional analyses of producer margin protection programs requested by to the DIAC. These analyses complement those provided previously and are described in more detail below. Our model structure allows analysis of four program parameters: the margin protected under a base plan, the production cap for the quantity of milk covered under the base plan, the margin protected under a supplemental plan, and the per cwt premium paid by producer for the volume of milk under the supplemental protection plan. This can be thought of as a “two-tier” system of base (no cost) and supplemental (partially or fully subsidized) coverage. At this time, the model is not configured to allow analysis of a “three-tier system” with two levels of supplemental coverage above the base. We consider programs that provide selected combinations of base margin protection for \$4, \$5 and \$6/cwt for no production cap, 4 million lbs per farm per year and 2 million lbs per farm per year. The analyses for the supplemental margin protection assume protection of a \$6 margin, in addition to the base protection program, for premiums up to \$0.27/cwt. The margin to be protected uses that proposed by the Foundation for the Future (FFTF) program, which subtracts a feed cost from the US all-milk price.

The key outcomes of interest are the net farm operating income for different farm size categories and government expenditures. The average all-milk price and price variation are of secondary interest.

Assumptions

As in analyses previous provided to the DIAC, this analysis assumes that all producers will receive no-cost margin protection coverage for all milk below the production cap (ranging from no limit to 2 million lbs per farm per year in our analysis). We also assume that the proportion of milk covered by voluntary supplemental programs depends on two factors: 1) the value of the margin protected (\$6/cwt in these analyses) and the premium per cwt of protected milk. In this preliminary analysis, we assumed that if the premium is 0, producers will cover all milk above the cap, but that the proportion of milk for which supplemental milk is covered declines as the premium increases until essentially no milk is covered at a premium of \$2.00/cwt¹. The proportion of milk for which supplemental coverage is purchased also depends on the value of the margin protected, increasing as the protected margin is increased from \$4 to \$6/cwt. Under the parameters assumed for this analysis, the proportion of milk under supplemental margin protection is around 70%. This response to supplemental coverage available is an educated

¹ The proportion of milk for which supplemental coverage is purchased is given by the exponential function
Proportion of milk = $1/\text{EXP}\{(\text{Premium}/\text{Reference Premium}) * (\text{Margin Parameter}/\text{Supplemental Margin Protected})\}$.

guess about the probable response of producers (who we assume have a limited interest in full-cost supplemental insurance).

Additional Scenarios

Using the dynamic simulation model developed to assess the impact of proposed programs on price volatility (Nicholson and Stephenson, 2010), we simulated the outcomes for nine scenarios:

- 1) A *Baseline* with current programs (and no margin protection program);
- 2) A margin protection program with a \$4 margin protection, no quantity limit for the base margin protection program, and no supplemental margin premium paid by producers (“BMarg=4 Cap=None Prem=0” in the graphs below). Because the specified margin falls to \$4/cwt only for a short time at the end of the simulation period, this scenario is essentially one without government intervention except for federal milk marketing orders;
- 3) A margin protection program with a \$5 margin protection, no quantity limit for the base margin protection program, and no supplemental margin premium paid by producers (“BMarg=5 Cap=None Prem=0” in the graphs below);
- 4) A margin protection program with a \$6 margin protection, a 2 million lb per farm per year limit for the base margin protection program, and a no supplemental margin premium paid by producers (“BMarg=6, Cap=2mil Prem=0” in the graphs below);
- 5) A margin protection program with a \$6 margin protection, a 4 million lb per farm per year limit for the base margin protection program, and a no supplemental margin premium paid by producers (“BMarg=6, Cap=4mil Prem=0” in the graphs below);
- 6) A margin protection program with a \$4 base margin protection up to 2 million lb per farm per year limit, a \$6 margin protection under the supplemental margin protection program and a supplemental margin premium of \$0.27/cwt paid by producers (“BMarg=4, SMarg=6 Cap=2mil Prem=27” in the graphs below);
- 7) A margin protection program with a \$4 base margin protection up to 4 million lb per farm per year limit, a \$6 margin protection under the supplemental margin protection program and a supplemental margin premium of \$0.27/cwt paid by producers (“BMarg=4, SMarg=6 Cap=4mil Prem=27” in the graphs below);
- 8) A margin protection program with a \$5 base margin protection up to 2 million lb per farm per year limit, a \$6 margin protection under the supplemental margin protection program and a supplemental margin premium of \$0.27/cwt paid by producers (“BMarg=5, SMarg=6 Cap=2mil Prem=27” in the graphs below);

- 9) A margin protection program with a \$5 base margin protection up to 4 million lb per farm per year limit, a \$6 margin protection under the supplemental margin protection program and a supplemental margin premium of \$0.27/cwt paid by producers (“BMarg=5, SMarg=6 Cap=4mil Prem=27” in the graphs below);

For all scenarios, the analysis assumes that the DPPSP and MILC programs are phased out in January 2012 (month 24 in the graphs below), replaced by the margin protection programs. The values of the program parameters were selected to illustrate the range of possibilities and, for the \$6 margin protection programs, to set total government expenditures equal to those under the Baseline scenario. We assume no significant feed cost or export demand shocks occur in any of the scenarios. For clarity, These scenarios are reported in two separate sets of graphs. The first set includes programs with only a base margin protection component (shown in Figures 1A-9A), whereas the second set includes those programs with supplemental protection (shown in Figures 1B-9B).

Results

These analyses suggest that:

- Patterns of Net Farm Operating Income (NFOI) generally are similar to the Baseline for programs without supplemental protection (Figures 1A-4A), except for the program with a \$4 margin protection program with no cap. This program results in greater variability of NFOI and a higher probability of negative NFOI during periods of low prices. A program with a \$5/cwt margin protection for all milk (without a supplemental program) is the most similar to the pattern of NFOI under a continuation of current programs;
- Programs with supplemental production tend to stabilize NFOI compared to the Baseline (Figures 1B-4B), due in part to a stabilizing impact on milk prices (Figures 8B and 9B). These programs also reduce the likelihood of negative NFOI compared to the Baseline;
- Margin protection programs without a supplemental program (the first set analyzed) result in somewhat higher cumulative NFOI for all farms during 2012 to 2019 (Figure 5A). The programs with supplemental protection result in somewhat lower cumulative NFOI for all farms during 2012 to 2019 (Figure 5B).
- In the absence of significant shocks, margin protection programs without a supplemental component are estimated to cost the government between \$52 million (\$4 margin protection, no cap) and \$2.9 billion (\$6 margin protection, 4 million lb cap) during 2012 to 2019 (Figures 6A and 7A). Programs with supplemental protection charging producers a premium of \$0.27/cwt are estimated to cost the government between \$2 billion and \$2.9 billion during 2012-19 (Figures 6B and 7B).
- The largest effects on milk price variation and the all-milk price occur for the programs that protect a \$6/cwt margin under a supplemental program (Figures 8A and 9A, Figures 8B and 9B). The

average all milk price after program implementation in 2012 and a one-year adjustment period for programs without supplemental coverage are:

Baseline	Base Margin=4 Cap=None Premium=0	Base Margin 5 Cap=None Premium=0	Base Margin=6 Cap=2 mil lbs Premium=0	Base Margin=6 Cap=4 mil lbs Premium=0
15.17	15.66	15.21	15.31	15.44

For programs with supplemental coverage, these values are:

Baseline	Base Margin=4 Supplemental Margin=6 Cap=2 mil lbs Premium=0.27	Base Margin=4 Supplemental Margin=6 Cap=4 mil lbs Premium=0.27	Base Margin=5 Supplemental Margin=6 Cap=2 mil lbs Premium=0.27	Base Margin=5 Supplemental Margin=6 Cap=4 mil lbs Premium=0.27
15.17	15.08	15.08	14.90	14.93

Note that with the margin protection programs, the average all-milk price does not serve as an accurate indicator of farm income.

References

Nicholson, C. F. and M. W. Stephenson. 2010. Analysis of Proposed Programs to Mitigate Price Volatility in the U.S. Dairy Industry. Report to a consortium of US dairy industry organizations. September.

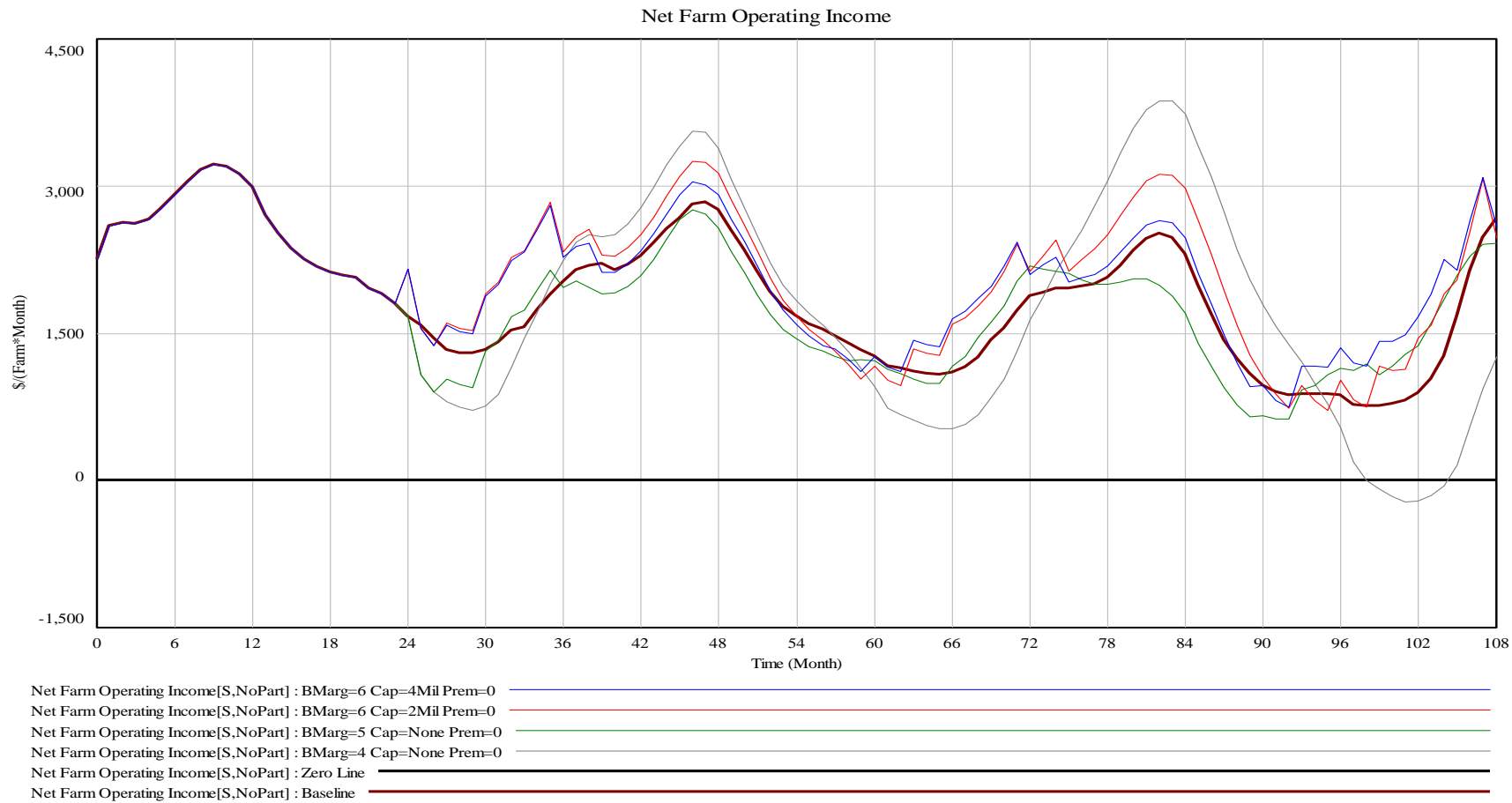


Figure 1A. Simulated Net Farm Operating Income, Small Farm, Four Alternative Margin Protection Programs and Baseline, 2010-2019

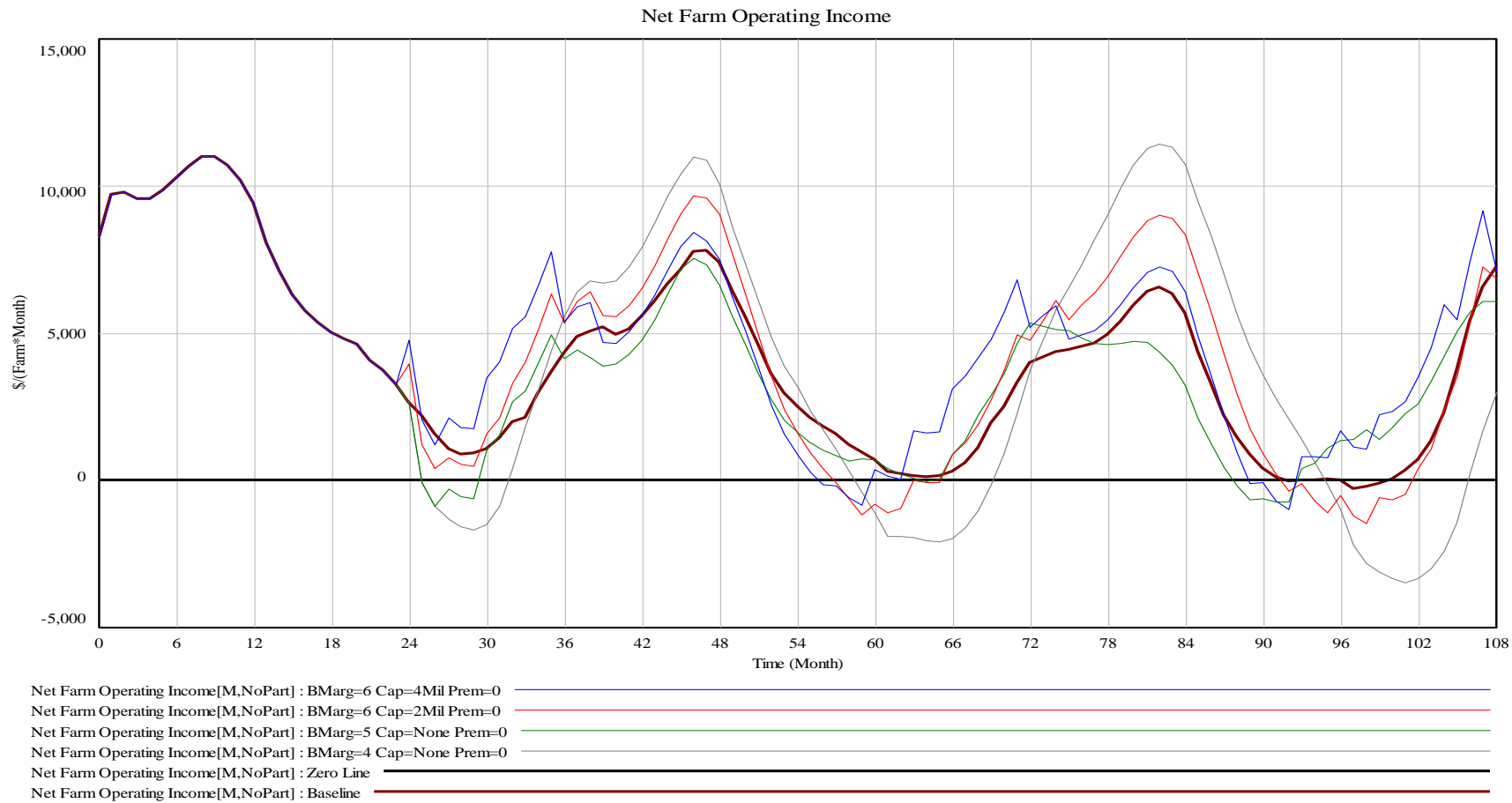


Figure 2A. Simulated Net Farm Operating Income, Medium Farm, Four Alternative Margin Protection Programs and Baseline, 2010-2019

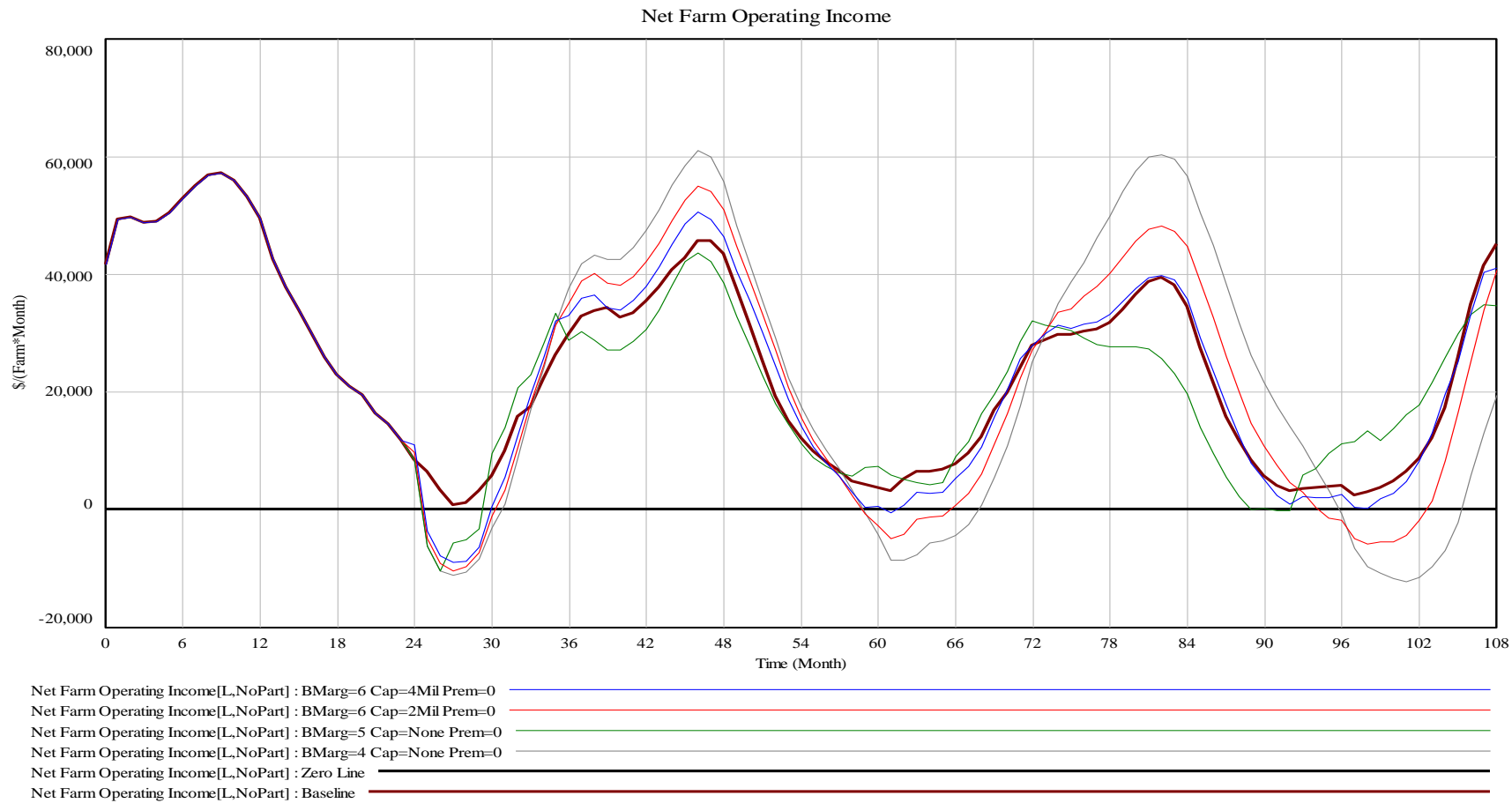


Figure 3A. Simulated Net Farm Operating Income, Large Farm, Four Alternative Margin Protection Programs and Baseline, 2010-2019

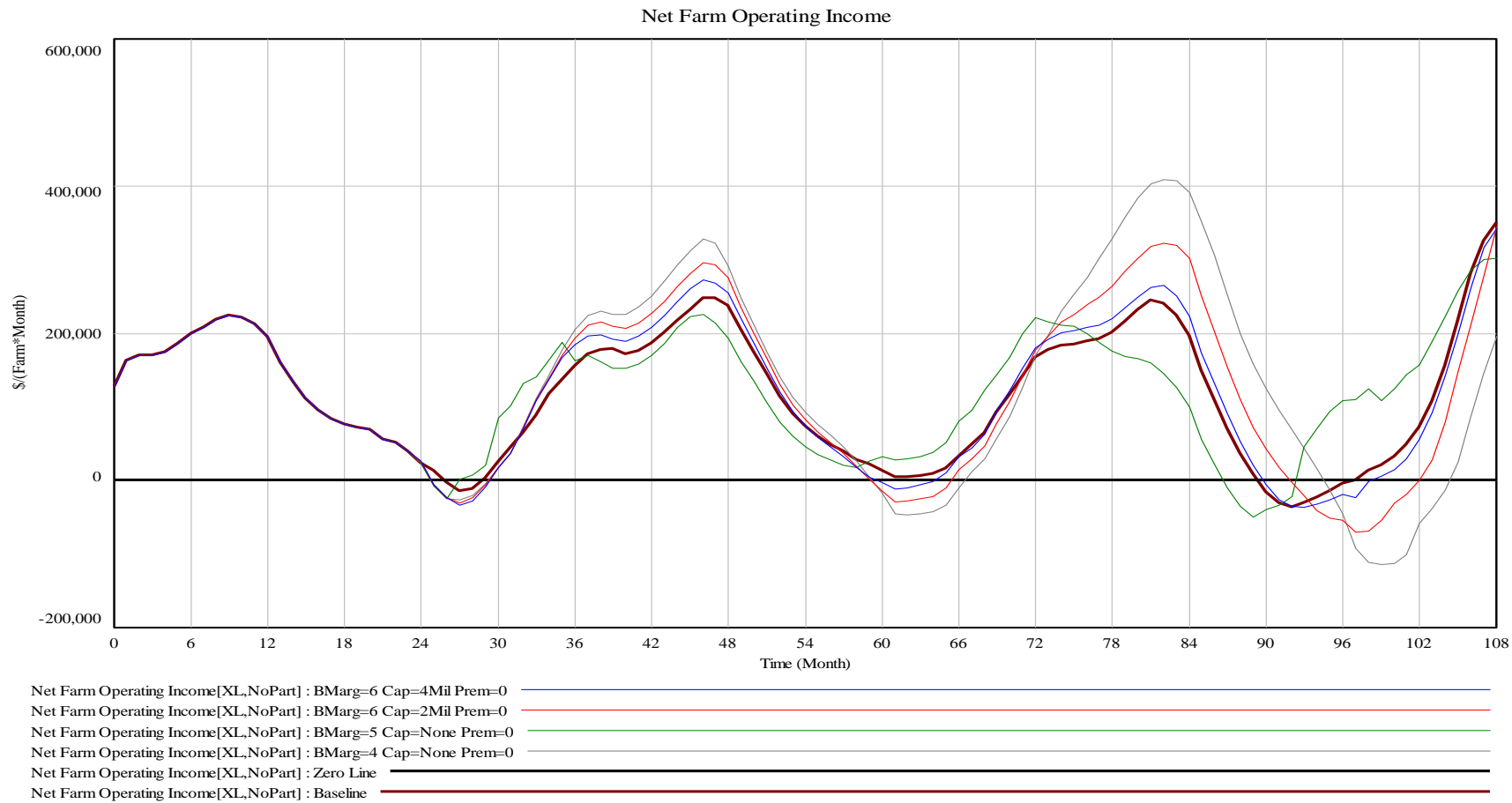


Figure 4A. Simulated Net Farm Operating Income, Extra Large Farm, Four Alternative Margin Protection Programs and Baseline, 2010-2019

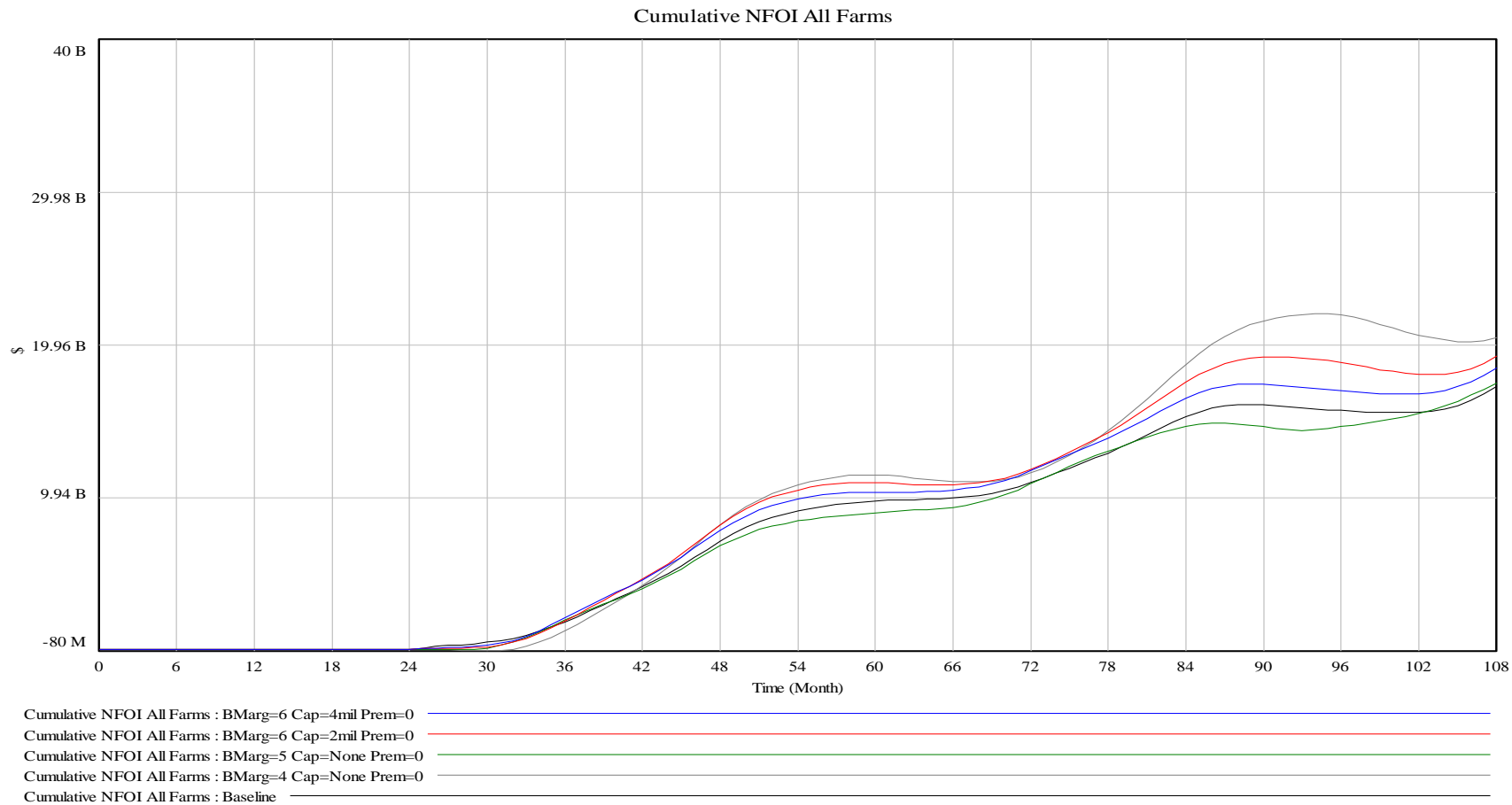


Figure 5A. Simulated Cumulative Net Farm Operating Income for All Farms, Four Alternative Margin Protection Programs and Baseline, 2010-2019

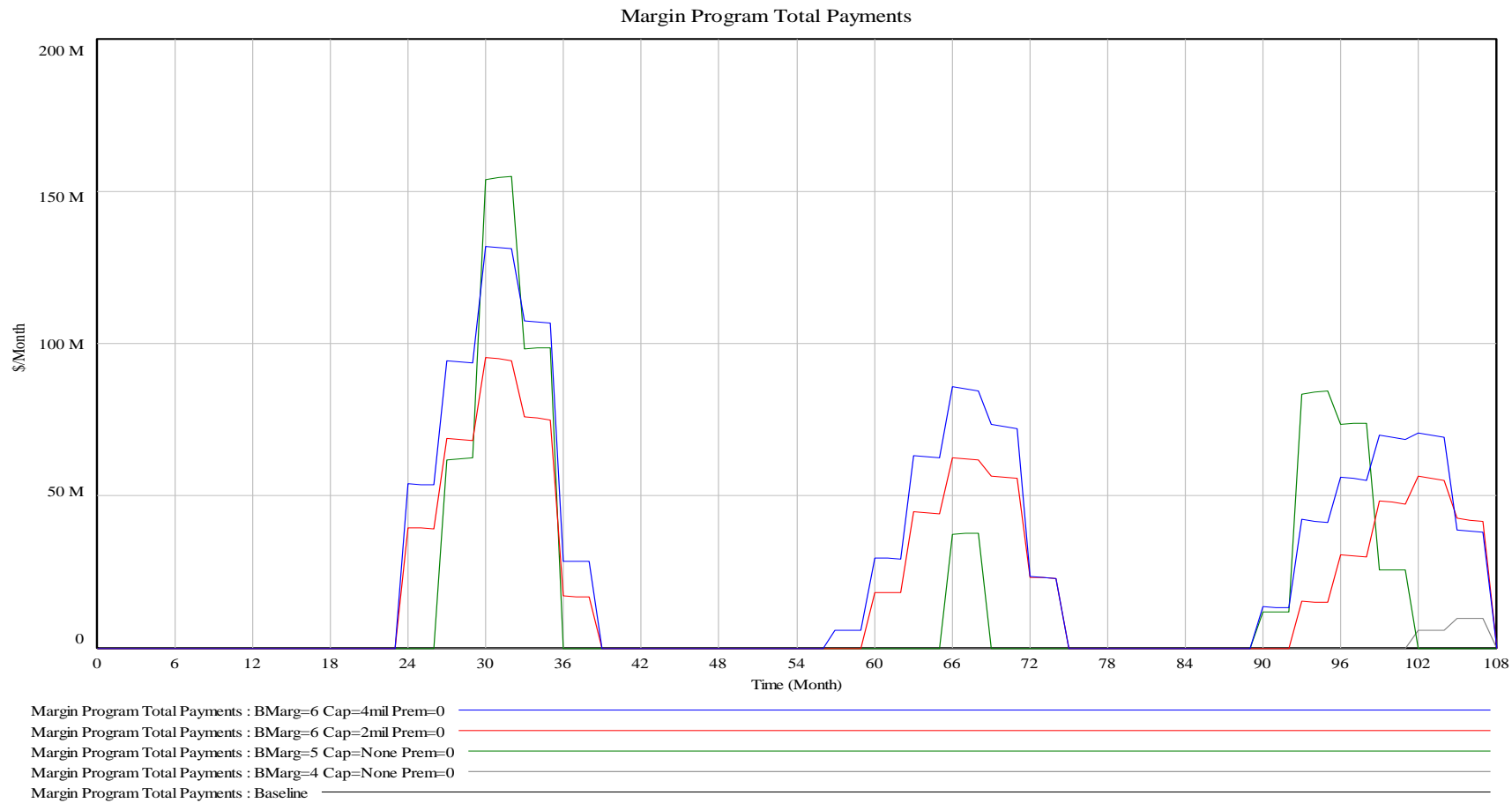


Figure 6A. Simulated Government Expenditures, Four Alternative Margin Protection Programs and Baseline, 2010-2019

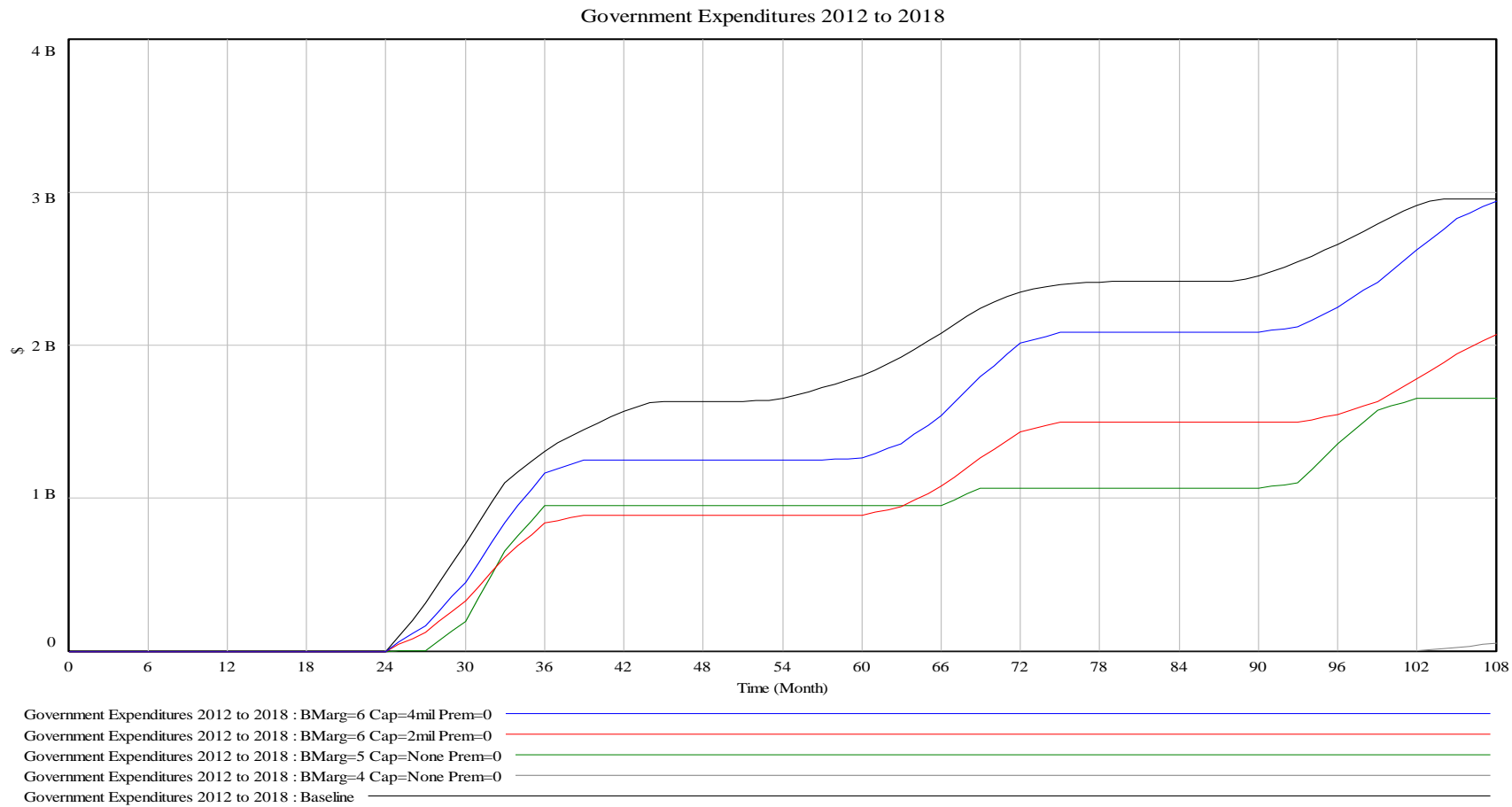


Figure 7A. Simulated Cumulative Government Expenditures, Four Alternative Margin Protection Programs and Baseline, 2012-2019

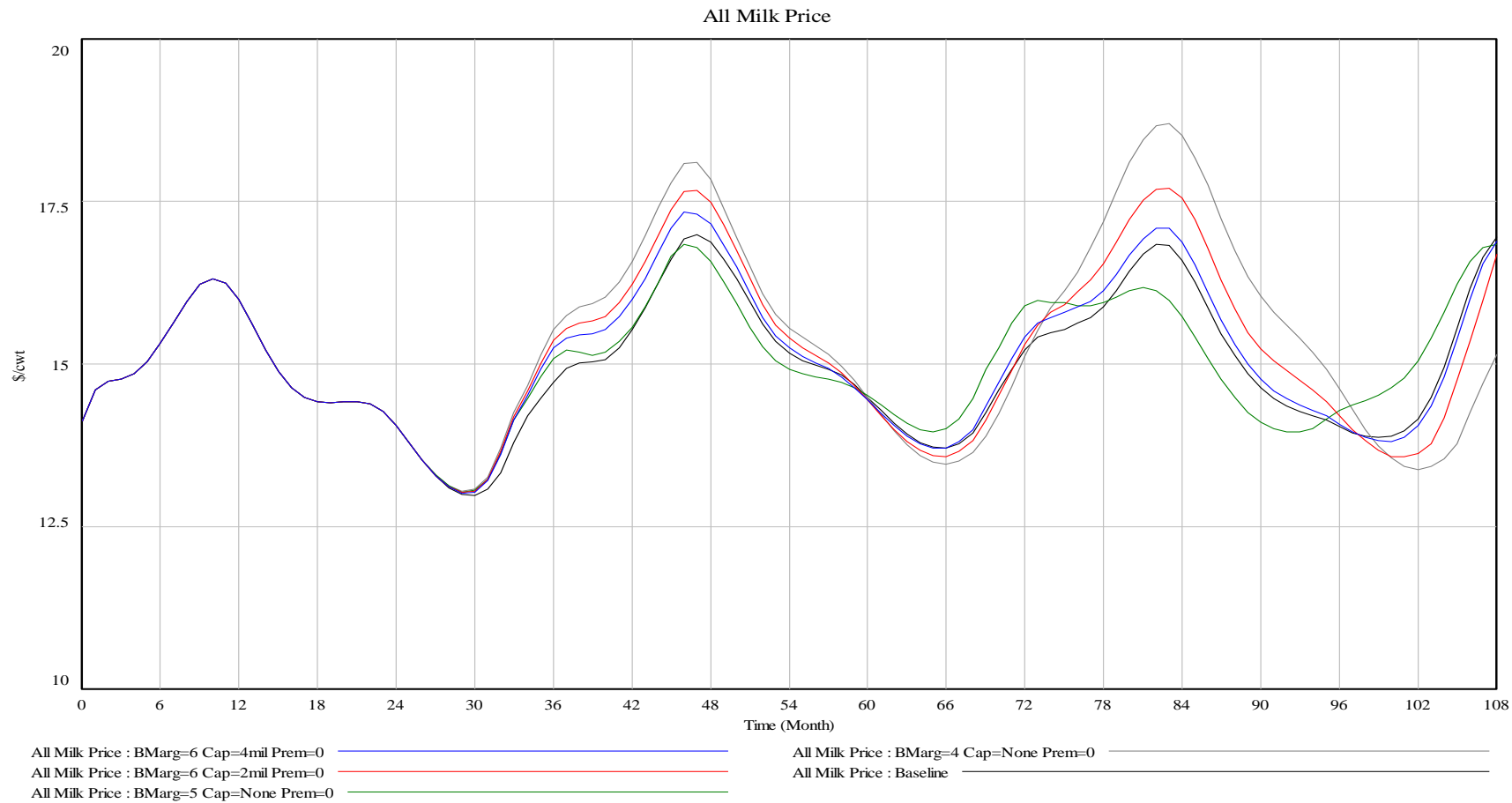


Figure 8A. Simulated All-Milk Price, Four Alternative Margin Protection Programs and Baseline, 2012-2019

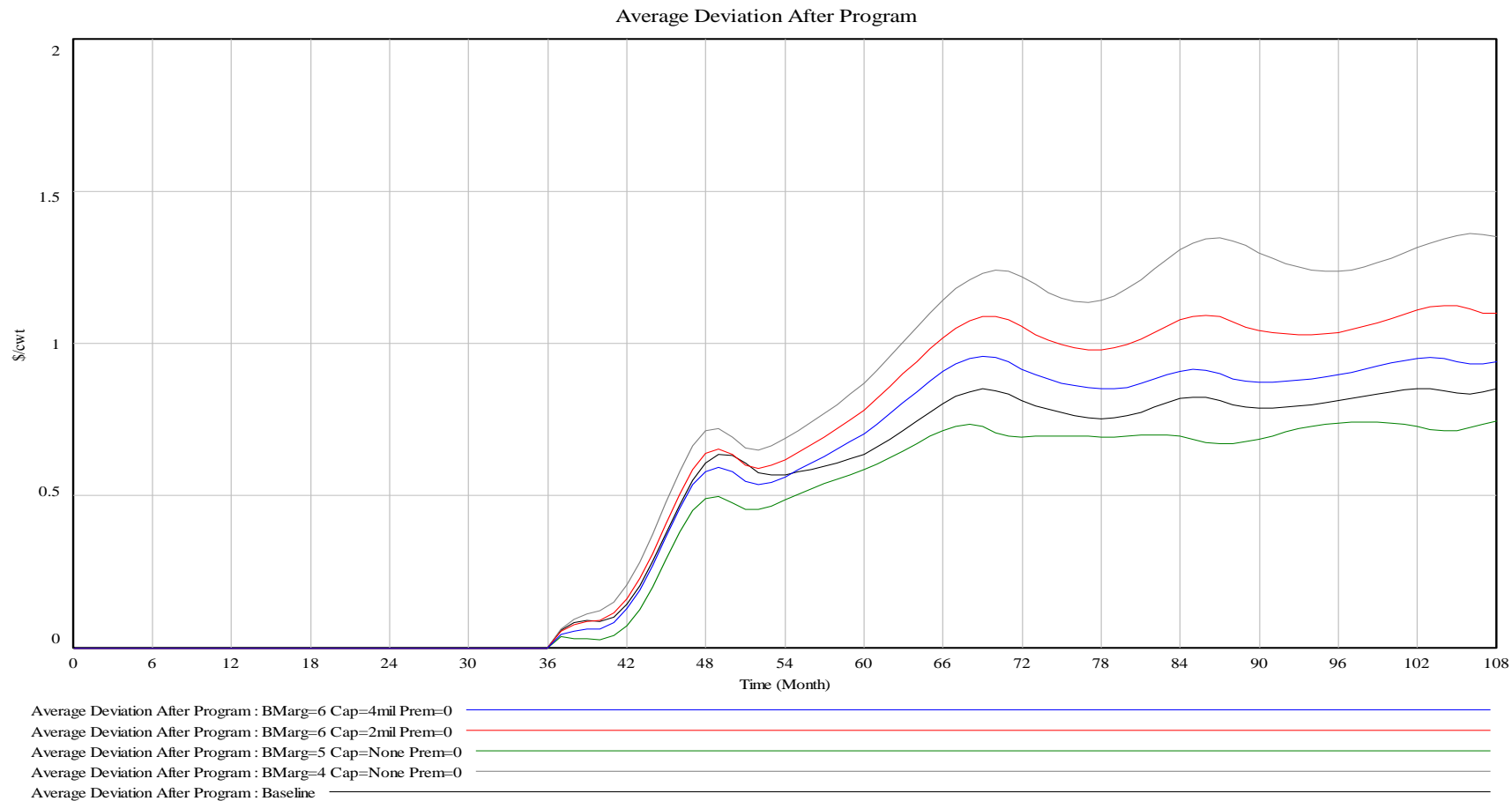


Figure 9A. Simulated Average Variation in the All-Milk Price, Four Alternative Margin Protection Programs and Baseline, 2012-2019

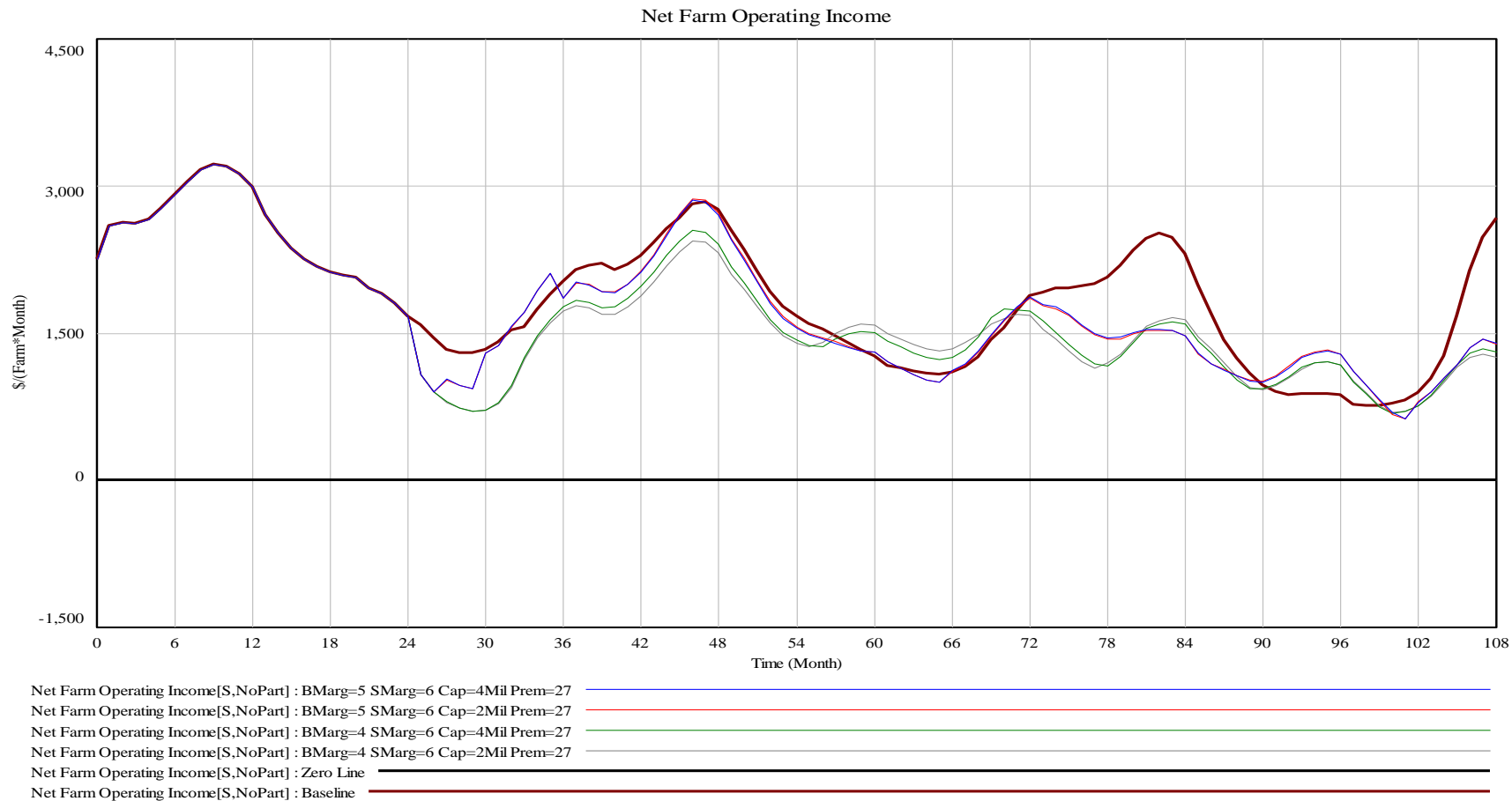


Figure 1B. Simulated Net Farm Operating Income, Small Farm, Four Alternative Margin Protection Programs and Baseline, 2010-2019

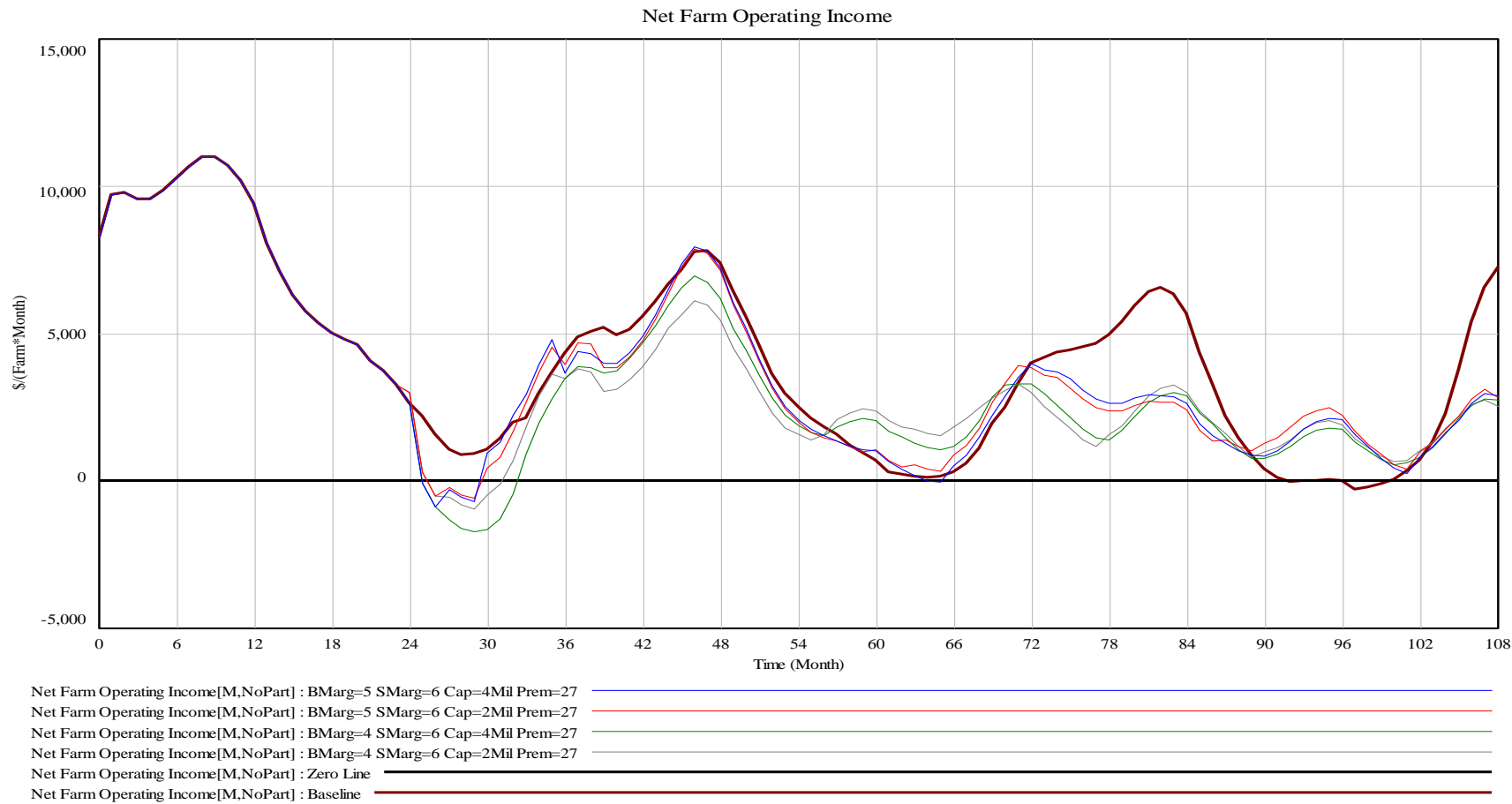


Figure 2B. Simulated Net Farm Operating Income, Medium Farm, Four Alternative Margin Protection Programs and Baseline, 2010-2019

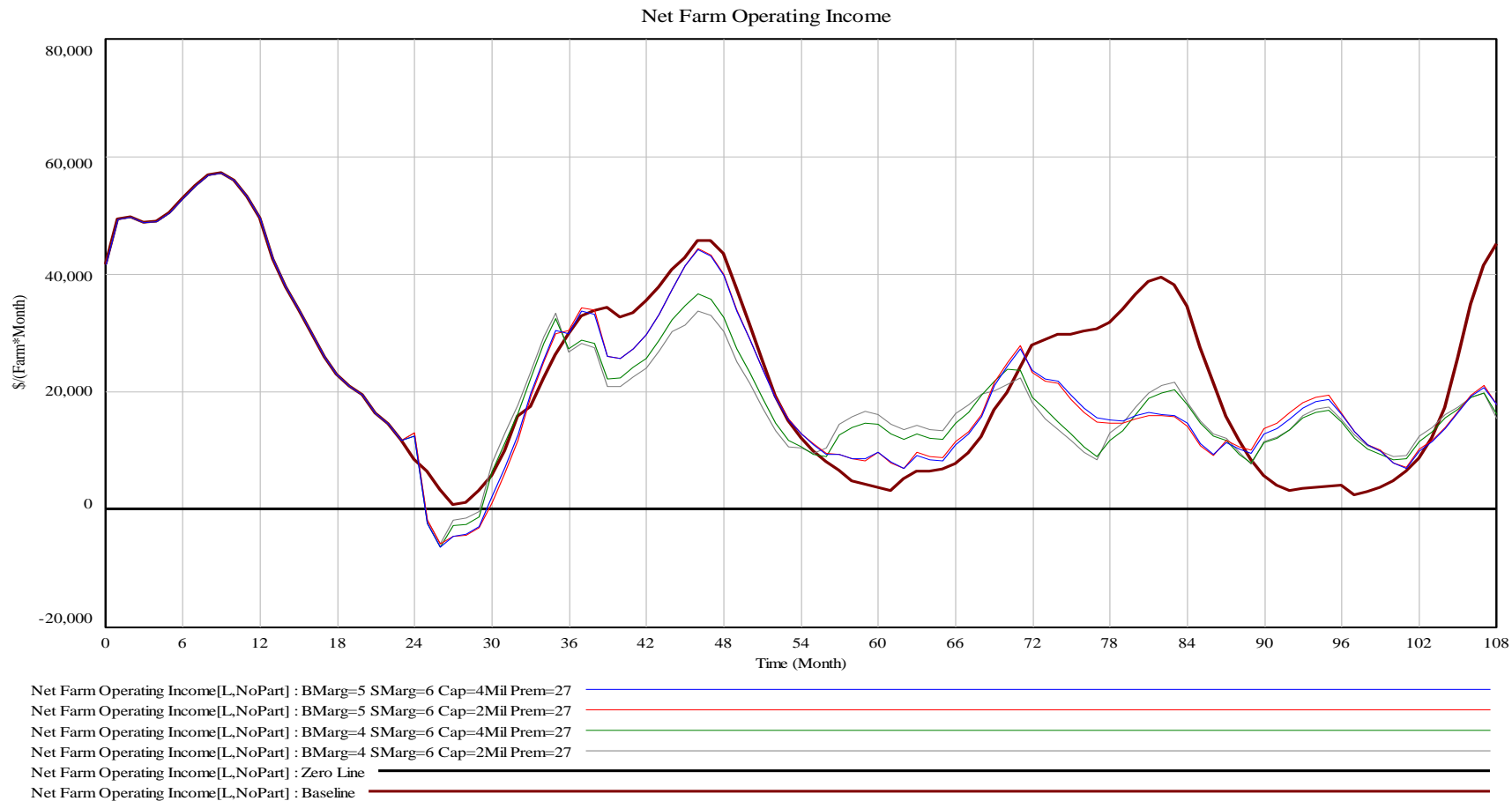


Figure 3B. Simulated Net Farm Operating Income, Large Farm, Four Alternative Margin Protection Programs and Baseline, 2010-2019

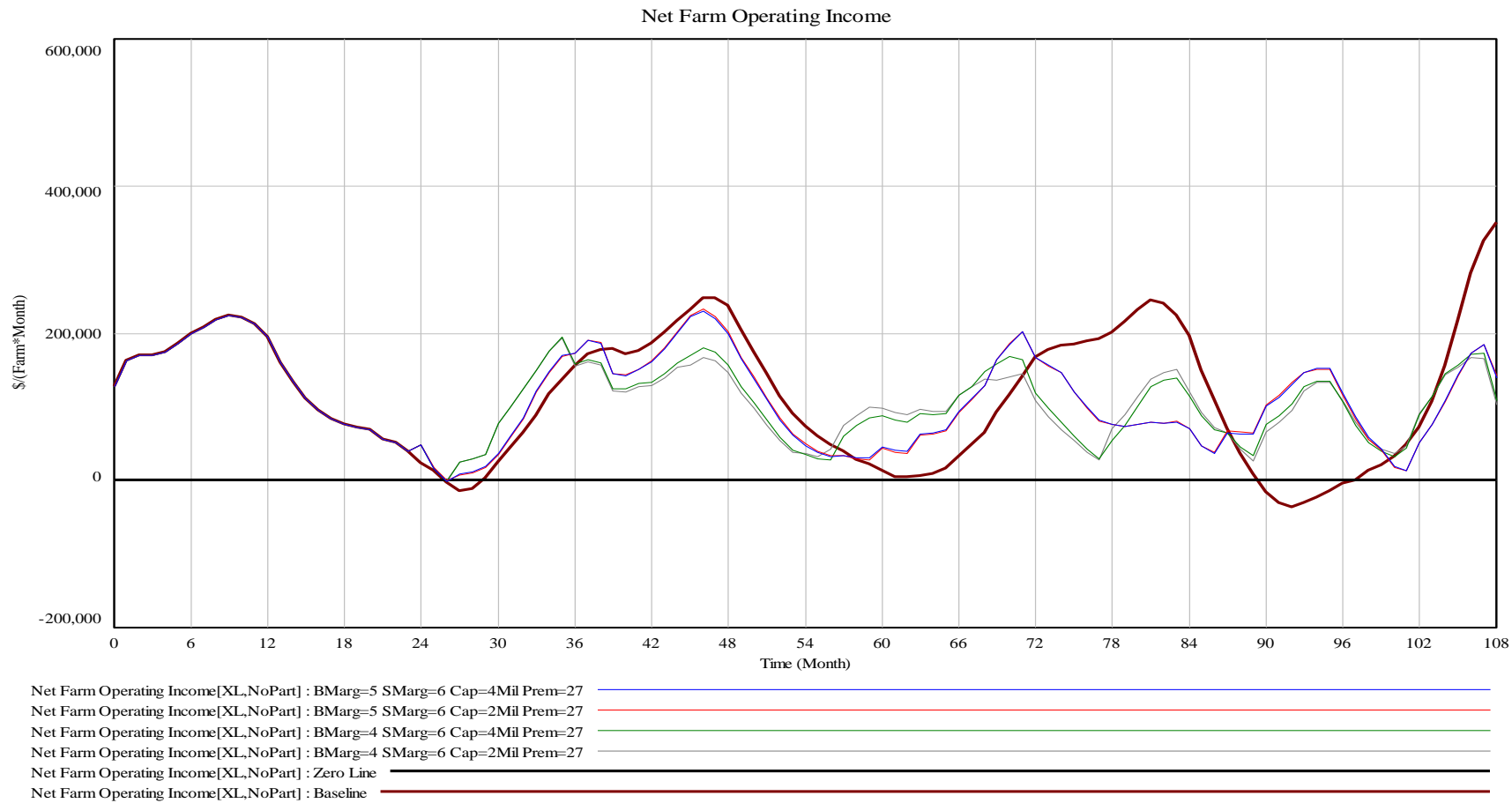


Figure 4B. Simulated Net Farm Operating Income, Extra Large Farm, Four Alternative Margin Protection Programs and Baseline, 2010-2019

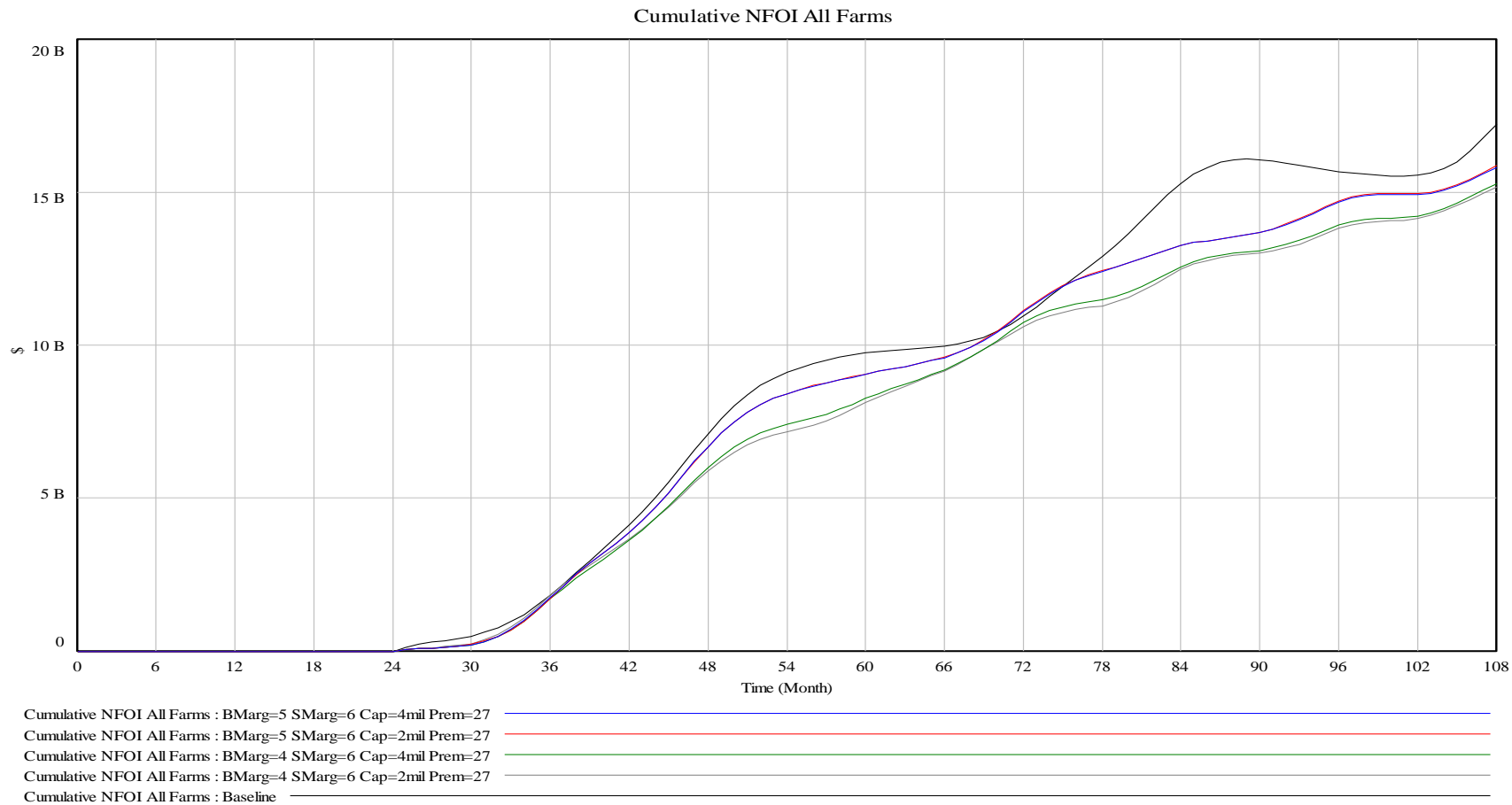


Figure 5B. Simulated Cumulative Net Farm Operating Income for All Farms, Four Alternative Margin Protection Programs and Baseline, 2010-2019

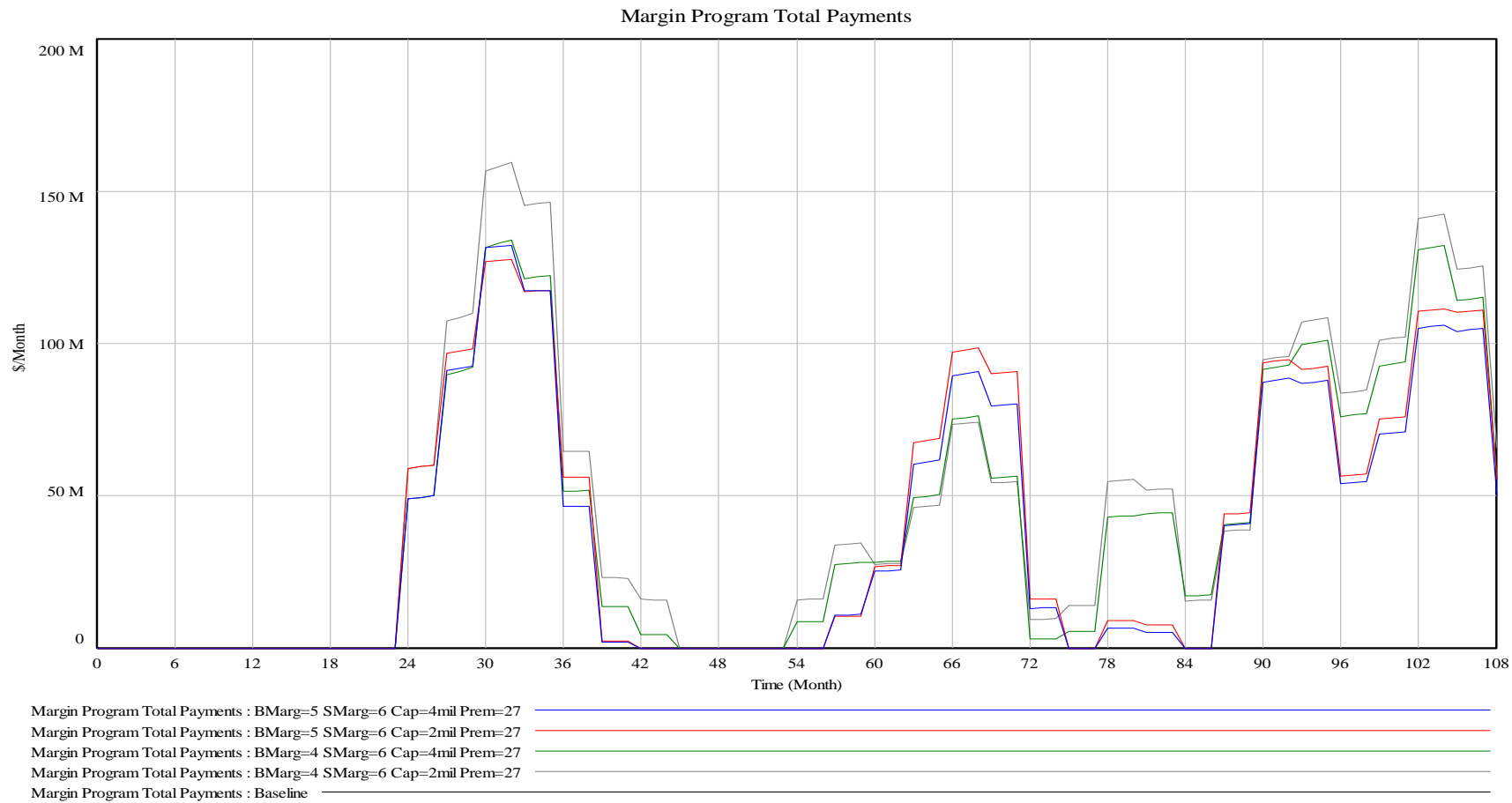


Figure 6B. Simulated Government Expenditures, Four Alternative Margin Protection Programs and Baseline, 2010-2019

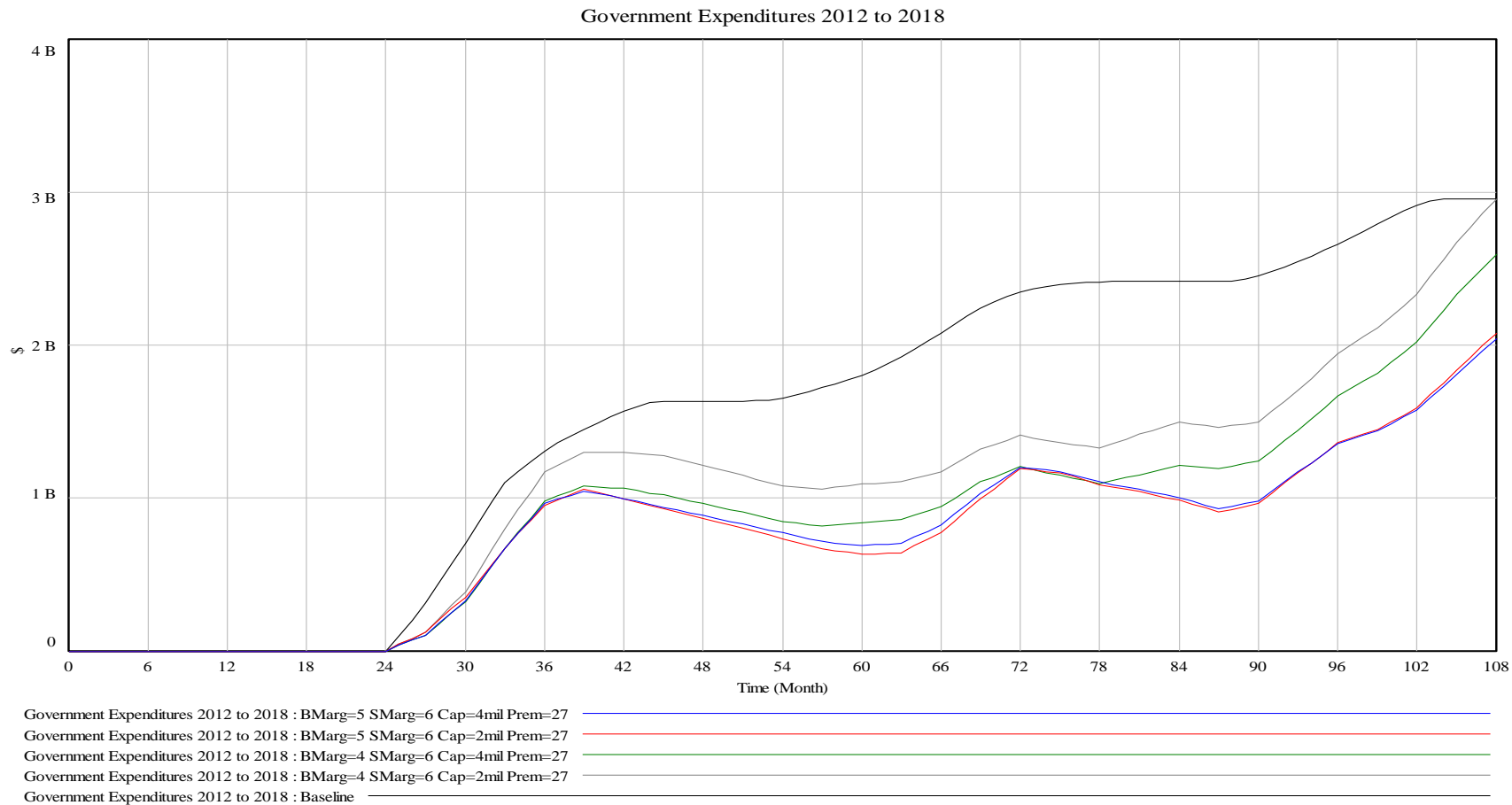


Figure 7B. Simulated Cumulative Government Expenditures, Four Alternative Margin Protection Programs and Baseline, 2012-2019

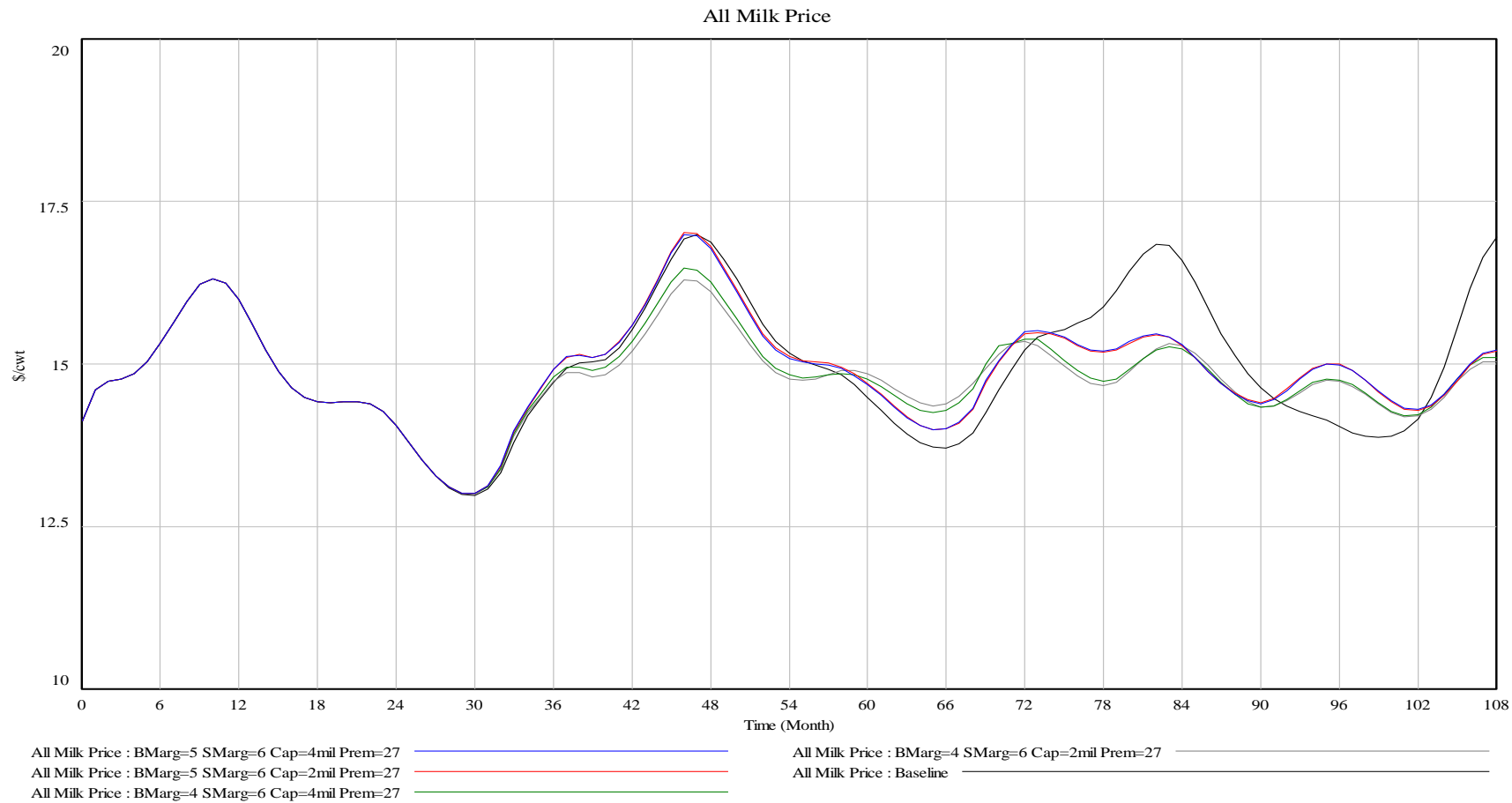


Figure 8B. Simulated All-Milk Price, Four Alternative Margin Protection Programs and Baseline, 2012-2019

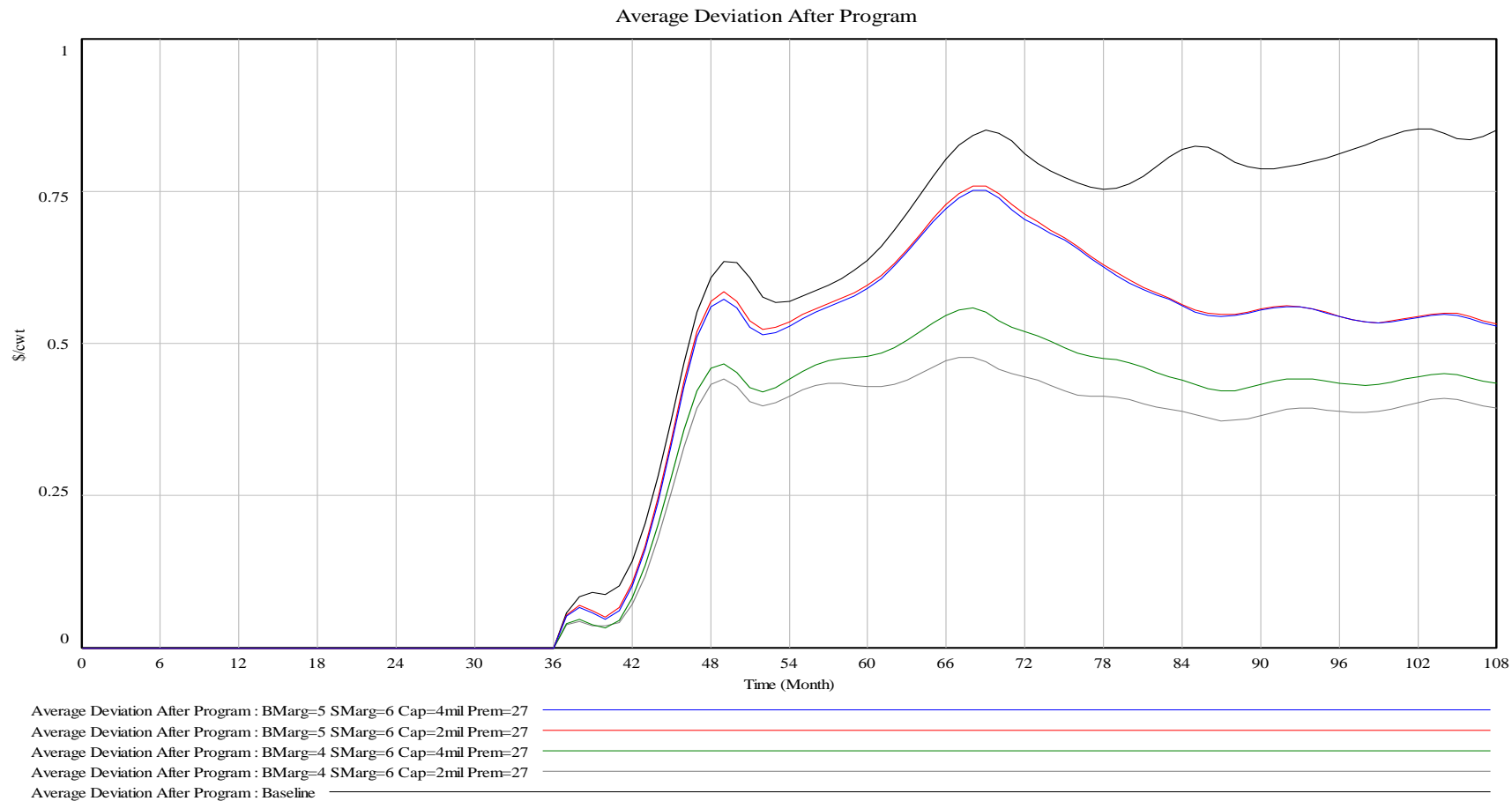


Figure 9B. Simulated Average Variation in the All-Milk Price, Four Alternative Margin Protection Programs and Baseline, 2012-2019